REMARKS/ARGUMENTS

Independent method Claim 14 has been amended by incorporating the subject matter of Claim 15, namely, that the radiation frequency component beat intensity is increased by means of a frequency modulated seed laser irradiating a seed light into the first laser. Various of the dependent claims have been amended to place them in better form.

Claims 1 and 14 have been rejected as being anticipated by Nakamura. For the reasons set forth hereinafter, it is submitted that the claims are not anticipated by Nakamura.

With regard to Claim 1, note is made that this claim claims the means for increasing the radiation frequency component beat intensity in means plus function format. Accordingly, the claim covers the corresponding structure set forth in the specification plus equivalents thereof in accordance with 35 U.S.C. § 112, paragraph 6.

In comparing Fig. 5 of Nakamura and Fig. 1 of the present application, both similarities and differences between the two are apparent. Fig. 1 of the present application shows an FSF laser comprising an acousto-optical modulator 1c. In Nakamura, an FSF laser is also provided with an acousto-optical modulator AOM wherein the AOM is excited with a signal generator connected to a PC. In the present application, the piezo element $1c_1$ excites the acousto-optical modulator 1c. In the present application an Ytterbium-based fiber 1d is utilized as the amplification medium. As set forth in paragraph 36 of the published application, energy from a point laser designed as a diode laser (not shown) is irradiated into the fiber so that it can be used as an amplification medium. Correspondingly, Nakamura discloses a pump LD irradiating light into a crystal used as the gain medium. In both the present application and Nakamura energy is provided into the gain medium via a pump laser. In the present application as shown in Fig. 1, the pump laser input can be accomplished by means of a fiber coupler 1e or the pump light $1e_2$ can be launched via the high-reflecting mirror 1b as indicated by the beam $1e_2$.

As described so far, and as pointed out in paragraph 37 of the published application, the Nakamura FSF laser and the FSF laser shown in Fig. 1 of the present application are closely related.

The major difference between Nakamura and the present invention as defined by Claim 1 is the presence in the claimed invention of means to increase the beat intensity of the frequency components emitted. In one embodiment, a means is provided to implement this is

an additional fiber coupler 2a shown in Fig. 1 that is utilized to coupled injection light 2b into the fiber, the injection light being emitted from an injection laser separate from the pump laser. No such injection laser is provided by Nakamura. It should be noted that the injection laser of the present invention is not the pump laser pumping energy into the gain medium to cause lasing. Rather, it is an injection laser serving a different purpose. The difference between pump light simply supplying enough energy to cause inversion in the gain medium on the one hand and injection light on the other hand being emitted from a second laser which is different from the pump laser is that the injection laser is utilized to increase the beat intensity of the emitted frequency components. Without a pump laser no emission of any frequency component would occur at all so the presence of the pump laser is common to Nakamura and the present invention. However, the pump laser is not a means to further increase the beat intensity of the emitted frequency components. Nakamura does not disclose a further injection laser as presently claimed in addition to the pump laser. Furthermore, it is believed that there is no incentive provided to include such an additional injection laser.

Similarly, method Claim 14 calls for the radiation frequency component beat intensity to be increased by means of a frequency modulated seed laser irradiating a seed light into the first laser, wherein the frequency of the seed laser frequency modulation is adapted to specific distances. This is not disclosed by Nakamura.

Independent Claims 1 and 14, as well as certain claims dependent thereon, have been rejected as anticipated by Phillips et al '199. As was the case with Nakamura, Phillips does not disclose the means for increasing radiation frequency component beat intensity that is an additional injection or seed laser. Phillips et al discloses a master oscillator laser 12 to produce a wide band light signal 35 having a plurality of discrete frequency components and also discloses a second laser light source 110 that is coupled to the primary amplifier 26 and second stage amplifier 40. However, it is not believed that this anticipates the subject matter defined by Claims 1 and 14.

What is disclosed in Phillips et al is different from a frequency shifted feedback laser as claimed in the present application. Phillips et al discloses seeding radiation of a fixed frequency into a ring cavity comprising an amplifier and a frequency shifting modulator. This ring cavity shifts the frequency of the laser seed radiation each time it makes a round

trip in the ring cavity. In this way, Phillips obtains a comb of frequencies with the seed laser frequency being the lowest comb frequency.

Accordingly, the ring cavity is a frequency shifting light amplifier. However, it is only an amplifier for seeded light. It is thus not a light amplifier for spontaneously emitted radiation (reference is made to the last three letters of the term LASER). It is thus not a frequency shifted feedback laser because spontaneous emission from an amplifier is not supposed to be amplified. For the second stage amplifier 40 this is stated explicitly in column 18, lines 2-9. Reference is also made to column 20, lines 16-20.

Phillips does not disclose seeding radiation into a laser. Rather Phillips seeds radiation into an amplifier and makes every effort to prevent the amplifier from lasing on its own.

The secondary references, even if combined with Nakamura do not supply disclosure that would render the claimed subject matter obvious.

Although Ito '723 discloses an FSF laser, Ito does not suggest to impart seed radiation into a laser nor suggest anything else to increase the beat intensity of frequency components emitted at different times. As indicated above, Phillips seeds radiation into a mere amplifier and makes every effort to prevent the amplifier from lasing on its own. Thus, Phillips does not render obvious the claimed invention even if combined with Ito.

With respect to Claims 2 and 21, the Examiner states that it would have been obvious to modify Nakamura to include the claimed means for increasing radiation frequency component beat intensity. However, this is hindsight reconstruction. The underlying quantum mechanics of the invention is complicated and it took considerable research to work it out.

Regarding Huang, Fig. 4c shows two lasers, namely the pump laser pumping the Brillouin medium and the signal laser. There is no FSF laser as claimed in the present application and no seed laser injecting radiation into an FSF laser.

The provisional double patenting rejection is noted. However, a terminal disclaimer was filed in Application Serial No. 10/511,842.

For the reasons set forth above, it is submitted that independent Claims 1 and 14 and the claims dependent thereon are neither anticipated nor rendered obvious by the prior art references, whether considered singly or in combination.

Although it is believed that the application is now in condition for allowance, if the Examiner believes that further issues remain, it is requested that he telephone the undersigned at 260-460-1692.

In the event Applicants have overlooked the need for an extension of time, payment of fee, or additional payment of fee, Applicants hereby petition therefor and authorize that any charges be made to Deposit Account No. 02-0385, Baker & Daniels.

Respectfully submitted,

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Date